

## 144. *Occurrence of Toucasia in the Lower Cretaceous of Japan.*

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Pachyodont bivalves are extremely rare in the Cretaceous rocks of Japan, a unique species hitherto known of this sort being *Praecaprotina yaegashii* (Yehara)<sup>1)</sup> from the Lower Cretaceous of Miyako, province of Rikuchû in Honshû, and of Hokkaidô. In Hokkaidô, this mollusc is found in the *Orbitolina*-limestone intercalated in the lower part of the Lower Ammonite Beds (Aptian to Gault), which is exposed along the lower course of the Sorachi-gawa, between Ponmoshiri and Shimano-shita, province of Ishikari.

In the summer of last year Y. Hattori and S. Ikegami, students of our Department, obtained numerous specimens of another pachyodont bivalve from this limestone. A few but better specimens of the same mollusc were collected this summer from the northerwestern foot of Mt. Ashibets in the same district by K. Hashimoto, student of the Institute of Geology and Palaeontology, Sendai. These specimens agree, as stated below, fairly well with *Toucasia carinata* (Matheron), a well known Lower Aptian species of Europe. The occurrence of this fossil in Japan is, the writer believes, of no small importance geologically as well as palaeontologically.

*Toucasia carinata* (Matheron) var. *orientalis* Nagao nov. var.

(Text-Figs.)

Shell small, very inequivalve with the lower (left) valve attached to a foreign body and the upper (right) free. Test thin.

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1) S. Yehara: A Pachyodont Lamellibranch from the Cretaceous Deposits of Miyako in Rikuchû. Jour. Geol. Soc. Tokyo, Vol. XXVII, 1920, pp. 39-43, Pls. XI, XII. H. Yabe and T. Nagao: *Praecaprotina*, nov. gen., from the Lower Cretaceous of Japan. Sci. Rep. Tohoku Imp. Univ. Sendai, Ser. 11, Vol. IX, 1926, pp. 21-24, Pl. VII.

Lower valve similar in form to that of *Toucasia carinata* (Math.)<sup>1)</sup>; anterior side compressed, nearly flat and separated by a round carina from the posterior side which is moderately and evenly convex; surface covered by a thick dark-coloured epidermic layer and ornamented with numerous, crowded and fine longitudinal striae as well as transverse lines of growth which are usually faint though sometime distinct. A shallow longitudinal groove impressed on the posterior surface runs between the two siphonal zones and almost coincides in position with the posterior myophoric lamina inside.

Upper valve small, oval in outline, rather strongly elevated with a distinct carina which is probably round; surface in front of this carina nearly flat, sloping gently toward the anterior margin, while that behind the carina is very steeply inclined downward and sometimes even vertical. Umbo not preserved.

Hinge not perfectly visible in all the specimens examined, but seemingly not much different from that of *T. carinata*; posterior myophoric lamina of the upper valve distinctly separated from the cardinal plate, triangular in cross-section, and elevated from and perpendicular to the inner surface of the posterior wall of the valve, being very oblique to the plane of commissure of the valves; hinge of the lower valve also strong and elevated from the wall almost perpendicularly.

From the above description it is beyond doubt that the present form belongs to the genus *Toucasia* and especially to the group of *T. carinata* (Math.), as suggested by the triangular cross-section of the posterior myophoric lamina of the upper valve. The typical examples of *T. carinata* seem to have a rather shallow upper valve, with its anterior surface slightly more convex and the posterior inclined more gradually, forming a smaller angle with the plane of commissure of the valves than in our specimens. These features, however, are apparently variable to some extent among different individuals, for

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1) A. d'Orbigny: Paléont. Franc., Terr. Crét., T. IV, 1847-51, p. 248, Pl. 576, fig. 1 (*Requienia Lonsdalii*). F.J. Pictet and G. Campiche: Foss. Terr. Crét. Ste. Croix. Matér. Pal. Suisse, Ser. 5, p. 14, Pl. CXLI, figs. 2, a, b, c (*R. Lonsdalei*). H. Douvillé: Sur quelque formes nouvelles ou peu connues de la famille des Chamidés. Bull. Soc. géol. Fr., Ser. 111, Vol. XV, 1887, p. 762, Pl. XXVIII, fig. 2; Rudistes du Crétacé inf. des Pyrénées. Ibid., Vol. XVII, 1889, p. 630, figs. 1, 2. V. Paquier: Les Rudistes urgoniens. Mém. de la Soc. géol. de Fr., Paléontologie, Mém. No. 29, 1903, p. 41, Pl. V, figs. 4, 5. Pl. VI, figs. 1, 2. H. Douvillé: Les Réquiénidés et leur évolution. Bull. Soc. géol. Fr., Ser. 4, Vol. XIV, 1914, p. 385, Pl. XI, figs. 3, 4.

two specimens of this species from Orgon, France, in the possession of our Department, are quite identical to ours in these respects. *T. transversa* Paquier<sup>1)</sup> from the Lower Aptian of France, separated by Paquier from the typical *T. carinata*, is easily distinguished from the Japanese form in question, in having the upper valve provided with a more developed posterior part which distinctly projects beyond the posterior surface or the lower valve. *T. carinata* var. *compressa* Paquier<sup>2)</sup> from the Aptian of France has the lower valve more compressed laterally, while var. *euxina* Astre<sup>3)</sup> from the Upper Barremian of Asia Minor is nearly identical with ours in the form of the lower valve but differs in that of the upper which is larger, longer and, moreover, not carinated. In short, the Japanese fossil under consideration is closely related to *T. carinata* itself, though it is smaller in size, less pronounced in carina and finer in longitudinal sculpture of the lower valve. Under these conditions, the varietal name *orientalis* nov. is here proposed for the present form which will be illustrated more in detail in a forthcoming number of the Journal of the Faculty of Science, Hokkaidô Imperial University, Ser. IV.

Horizon: *Orbitolina*-Limestone of the Lower Ammonite Beds.

Age: Aptian (most probably lower).

It is worthy of note that the present form is the first example of *Toucasia* from Asia except Asia Minor from where *T. carinata* and var. *euxina* have been reported. The typical examples of the species occur in France, Iberian Peninsula, Switzerland, and Bulgaria and var. *compressa* Paq. in France. Thus this type of *Toucasia* has a wide geographical distribution occurring in as far afield as Japan, where it is represented by the present variety.

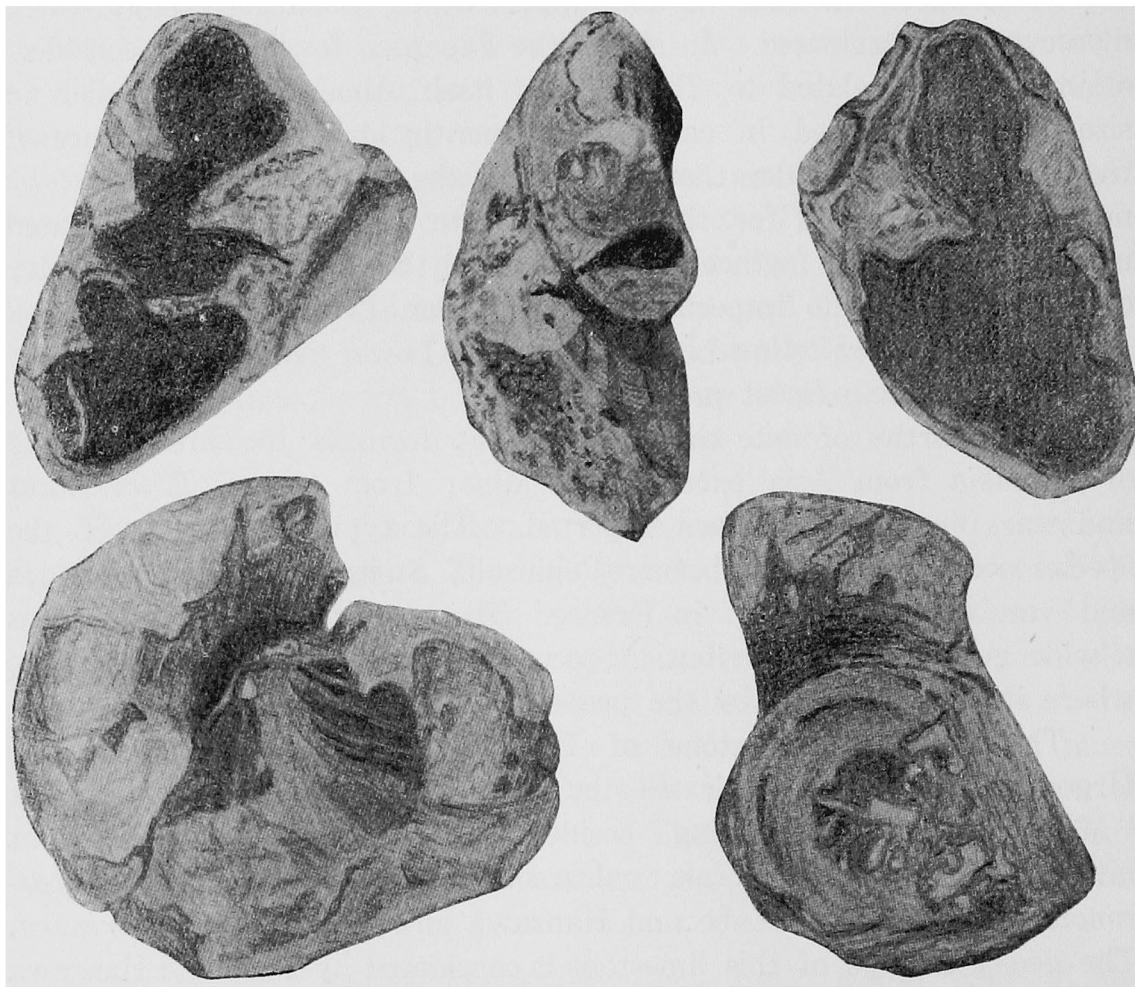
The *Orbitolina*-limestone of Hokkaidô certainly belongs to the Urgonian facies and indicates the far eastern prolongation of the "Mère mésogée," containing, besides the two forms of pachyodont bivalves, reef-building corals, calcareous algae, *Orbitolina discoidea-conoidea* var. *ezoensis* Yabe and Hanzawa and thick-shelled *Nerinaea*. The geological age of this limestone is considered by Yabe and Hanzawa as Aptian, a view which finds strong support in the occurrence of the

1) V. Paquier: Les Rudistes urgoniens. Op. cit., p. 44, Pl. V, figs. 6, 8; Pl. VI, figs. 5, 6.

2) V. Paquier: Ibid., p. 43, Pl. VI, figs. 3-4.

3) G. Astre and F. Charles: Note sur des petites *Toucasia* d'Anatolie, suivie des considerations stratigraphiques que en découlent sur la région de Tarla-Agzy (Bartine). Bull. Soc. géol. Fr. Ser. V, T. 1, 1931, p. 698.

pachyodont bivalve in question. H. Douvillé<sup>1)</sup> has shown that the degree of the separation of the posterior myophoric lamina of the upper valve from the cardinal plate was accelerated progressively with geological ages among various forms of *T. carinata* and its allied species. The new variety *orientalis* is doubtlessly more advanced in this feature than *T. praecarinata* Douvillé from the Upper Barremian of France and corresponds to *T. carinata* and var. *euxina*, in having the said lamina distinctly separated from the cardinal plate. *T. carinata* and var. *euxina* indicate the Upper Barremian or more probably the lower Aptian.



*Toucasia carinata* Math. var. *orientalis* Nagao nov. var. Nat.-size.

1) H. Douvillé: Le Barrémien supérieur de Brouzet. Pt. 111. Les Rudistes. Mém. Soc. géol. Fr., Paléontologie, Mém. No. 52, 1918, p. 7, Pl. 1, figs. 1-5.